Amendments to the Specification:

Page 14, amend the paragraph beginning on line 8 to read as follows:

~~- Figure 1 diagrammatically shows the distinct separation of an oil phase and of a gas phase at equilibrium in the reservoir,~~

Page 14, amend the paragraph beginning on line 10 to read as follows:

- Figures ~~2 to 5~~ 1 - 4 compare the results of a compositional simulation with a three pseudo-component representation (results referred to as ternary), obtained by applying the method according to the invention, with the results of a detailed compositional simulation with sixteen base constituents (results referred to as reference),

Page 14, amend the paragraph beginning on line 14 to read as follows:

- Figures ~~6~~ 5 and ~~7~~ 6 show, for the detailed and ternary representations, respectively the variation of the attraction term and of the covolume (expressed in dimensionless form) of the oil and gas phases as a function of the pressure during the thermodynamic simulation of a depressurization operation at constant volume at reservoir temperature,

Page 14, amend the paragraph beginning on line 18 to read as follows:

- Figures ~~8.1~~ 7A to ~~8.16~~ 7P on the one hand and Figures ~~9.1~~ 8A to ~~9.16~~ 8P on the other hand show, per constituent, respectively the detailed composition of the gas and of the oil, during the same depressurization operation, as obtained from the

reference representation, and from delumping of the three pseudo-component representation,

Page 14, amend the paragraph beginning on line 22 to read as follows:

- Figure ~~10~~ 9 recapitulates the results illustrated in Figures ~~8.1~~ 7A to ~~8.16~~ 7P and ~~9.1~~ 8A to ~~9.16~~ 8P by showing the maximum absolute error obtained for the proportion of each constituent during the depressurization from 237.4 to 69 bars as a function of the proportion of constituent in the phase at the dew-point pressure of the initial fluid,

Page 15, amend the paragraph beginning on line 3 to read as follows:

- Figures ~~11.1~~ 10A to ~~11.16~~ 10P on the one hand and Figures ~~12.1~~ 11A to ~~12.16~~ 11P on the other hand show, per constituent, respectively the detailed composition of the gas and of the oil, during the thermodynamic simulation of a condensate vaporization operation by injection of a dry gas at a constant pressure of 169 bars, as obtained from the reference representation, and from delumping of the three pseudo-component representation, and

Page 15, amend the paragraph beginning on line 8 to read as follows:

- Figure ~~13~~ 12 recapitulates the results illustrated in Figures ~~11.1~~ 10A to ~~11.16~~ 10P and ~~12.1~~ 11A to ~~12.16~~ 11P by showing the maximum absolute error obtained for the proportion of each constituent for the vaporization operation as a function of the proportion of constituent in the phase at the beginning of the vaporization operation.

Page 19, amend the paragraph beginning on line 16 to read as follows:

~~Figure 1 diagrammatically shows~~ In connection with the distinct separation of an oil phase and of a gas phase at equilibrium in the reservoir, in the general situation, ~~where~~ the (simple or complex) separation of an initially single-phase mixture, liquid (oil) or gas, produces two phases, one gaseous, the other liquid.

Page 47, amend the paragraph beginning on line 7 to read as follows:

hh) Figures ~~2 to 5~~ 1 to 4 compare the results, over the fifteen simulated years of production of the SPE3 case, of a compositional simulation with three pseudo-components BRO (results referred to as 'ternary'), where the compositional representation was obtained by applying the method according to the invention, with those of a detailed compositional simulation with sixteen base constituents (results referred to as 'reference').

Page 48, amend the paragraph beginning on line 3 to read as follows:

The results shown in Figure ~~2~~ 1, which represent the evolution of the pressure at the bottom of a producing well, and in Figure ~~5~~ 4, which represent the oil (or condensate) saturation evolution in the deepest perforated grid in the producing well, are among the most revealing results of the right calculation of the equilibria and phase properties in the in situ conditions.

Page 48, amend the paragraph beginning on line 8 to read as follows:

It can be observed that the BRO model provides a pressure solution that practically merges with the reference solution (with 16 constituents) and an oil saturation evolution solution in good agreement with the reference solution over the

total simulated time. The grid used in Figure ~~5~~ 4 is the same one as the grid used in the reference paper by D.E. Kenyon and G. Alda Behie and in the paper by W.H. Goldthorpe mentioned in the prior art. It can be observed that the results of Figure ~~5~~ 4, judged by comparison with the results obtained by W.H. Goldthorpe with a BO modelling, show a much better quality of reproduction of the oil saturation evolution in the reservoir, whereas the procedure used to obtain the parameters of EOS_EQ is improvable.

Page 48, amend the paragraph beginning on line 17 to read as follows:

ii) The results shown in Figures ~~3~~ 2 and [[4]] 3 for the oil flow rate and cumulative oil production throughout the simulated time show that the BRO modelling provides a solution that is very close to the reference solution.

Page 53, amend the paragraph beginning on line 10 to read as follows:

It is with such a non limitative approximation that the delumping results :

- illustrated in Figs. ~~8.1~~ 7A to ~~8.16~~ 7P, Figs. ~~9.1~~ 8A to ~~9.16~~ 8P and recapitulated in ~~Fig.10~~ Fig. 9 for a depressurization operation of the fluid of the SPE3 case,

- illustrated in Figs. ~~11.1~~ 10A to ~~11.16~~ 10P, Figs. ~~12.1~~ 11A to ~~12.16~~ 11P and recapitulated in ~~Fig.13~~ Fig. 12 for a vaporization operation at a pressure of 169 bars of a condensate (the condensate obtained at 169 bars during the previous depressurization operation), were obtained.

Page 53, amend the paragraph beginning on line 17 to read as follows:

In Figs. ~~8.1~~ 7A to ~~8.16~~ 7P and ~~9.1~~8A to ~~9.16~~ 8P on the one hand, Figs. ~~11.1~~ 10A to ~~11.16~~10 P and ~~12.1~~ 11A to ~~12.16~~ 11P on the other hand, the proportion of each constituent in the phase considered is expressed in molar percentage of the phase and, in each figure, the scale is expanded to be suited to the variation of the proportion of constituent in the phase.

Page 54, amend the paragraph beginning on line 1 to read as follows:

The abscissa in Figs. ~~11.1~~ 10A to ~~11.16~~ 10P and Figs. ~~12.1~~ 11A to ~~12.16~~ 11P is the molar fraction of vapour during the vaporization operation, which increases from 0 (in the initial state, only the condensate phase, or oil, is present) to 1 when all of the condensate is vaporized.

Page 54, amend the paragraph beginning on line 5 to read as follows:

~~Fig.10~~ Fig. 9 and ~~Fig.13~~ Fig. 12 show that the maximum absolute error obtained for the proportion of each constituent (still expressed in molar percentage) remains below 0.1 % on average during the depressurization and vaporization operations.